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Individual Identification Labels for Pinned Insect Specimens

By GEORGE W. BYERS [1]

Several months ago, a friend and I were examining types of a certain family of Diptera in a university museum. Each type series was pinned to the right hand side of a label which bore the name of the species, while each pinned specimen carried a red label reading merely "holotype," "allotype," or "paratype." My friend removed one of the paratypes from the end of its row, examined it with his hand lens, and pinned it back into the tray, failing, however, to notice that he had placed it in the wrong row, thereby erroneously indicating it to be a paratype of quite another species. Fortunately this accident was immediately discovered and corrected. But how often do similar accidents occur, involving perhaps less important specimens, because of the lack of an identification label on each pinned insect specimen?

Collecting insects, somehow preserving them in the field, and in the laboratory pinning them and providing them with the essentials of collection data on labels all require little effort on the part of the entomologist, when time and expense are figured on a per-specimen basis. Identification, in contrast, usually involves a great amount of time and the expense of a library and other facilities appropriate to the problem at hand. Most collectors and curators, confronted with the task of species determination, are left no choice but to turn to qualified specialists for help. (This is quite apart from the fact that more often than not identifications by specialists are the only ones likely to

[1] Contribution no. 1009 from the Department of Entomology, University of Kansas, Lawrence, Kansas.

be correct.) Usually, for nearly any taxonomic category, a competent and willing taxonomist can be located; and in due time the specimens will be returned identified to the collector.

A museum specimen the identity of which has been determined by a qualified specialist has a much greater value than an unnamed specimen, but this value can easily be lost unless it is somehow permanently fixed. An identification label attached to the pin of only the first in a series of specimens seems to me to indicate an unwarranted faith in the infallibility of curators, technical assistants and all others who make use of collections in museums and other repositories; it is an invitation to confusion! After the taxonomist has arranged specimens in rows after an identification label (and some attach the determination to the *last* specimen in the series), there remain many opportunities for errors to creep in, as specimens are transferred to shipping boxes and later are unpacked and put into their permanent boxes or trays. Whenever the collection is used for whatever reason, there is a chance that a specimen removed from its place in the tray may accidentally be returned to another place. And a specimen merely placed alongside one bearing a determination label, even though it has been examined and identified by a competent authority, has no more status, in fact, than any number of other specimens later added to this group by other persons perhaps not at all qualified to make the identification concerned.

The logical solution to this problem is to attach an identification label to *every* specimen that has been identified. Such a label should indicate not only the genus and species (and subspecies, if any) but also the name of the person who made the identification and the date (year).

This would seem at first to be visionary, perhaps, but in fact it is quite an attainable goal. By a process of photo offset printing, the Snow Entomological Museum of the University of Kansas at the present time is able to have such labels made at a cost of about ten for one cent. The desired labels are typed on ordinary white bond paper, one $8\frac{1}{2} \times 11$-inch sheet of which will usually provide space for about 50 kinds of labels. As a

measure of economy, four such sheets are photographed together at the desired reduction of dimension and are printed in any number on high quality, stiff paper. Since both date-locality labels and identification labels are made at the same time, it is not necessary to withhold printing until a large number of kinds of identification labels alone are accumulated. Most of the cost in the process described is for preparation of copy (by electric typewriter at the University of Kansas), but it should be pointed out that any clear black line or typing on white paper will be satisfactory copy for photo offset printing. Cost is therefore a minor consideration, and certainly a specimen worth the time and effort required for identification is worth a label noting this work!

One very practical problem is that of the responsibility for attaching identification labels. As matters now stand, it usually falls to the curator of a collection to so label the specimens that are returned to him from various specialists. This situation has one serious disadvantage, namely, that it is more often the case than not that there will be very small numbers of specimens of most species, requiring either that most of the identification labels for that species be discarded or that blank labels (showing only the name of the authority and the date) be printed and the species' name be added by hand. The first of these alternatives is unsatisfactory for reasons of economy, and the second introduces a further chance of error in transcription of the name. It therefore seems to me that the responsibility for attaching identification labels to each and every specimen identified should pass to the determining authority. He should have in his possession supplies of these inexpensive labels for all species in his particular taxonomic group, so that only the last two digits of the date would need to be filled in. Persons doing a great deal of identification work might have even the date completed on the printed label.

It seems not unreasonable to think that the taxonomist would actually prefer to render this service, for then he would have some assurance that the order he had worked so hard to create would be maintained and that mixing of specimens after they

had left his hands would not result in confusion that could be attributed to him. Some taxonomists have argued with me that they are too busy to attend to the mere routine of attaching identification labels, but such a view would mean either that they consider the curator's time less valuable or that they do not believe in the desirability of fixing the identity of each specimen they have studied. (It might be suggested that surely one whose time is so valuable will have assistants!) Thus, if identification labels are to be attached at all, the logical time and place for this to be accomplished is at the time of species determination and in the laboratory where the identification is made.

Should a taxonomist be working alone, that is, not as a member of an institution, preparation of labels might be more expensive and less convenient. Such a taxonomist, however, might arrange to obtain labels from institutions for which he is making identifications.

Who would think of placing specimens in a permanent collection with a single date-locality label for each series of a species taken at one time and place? Who would attach collection data and identification to only one microscope slide of a series, with only a notation that all slides between that one and a certain other one should be regarded as having similar data? Surely the logic and desirability of the identification label for each specimen identified is inescapable.

Acanthothrips palmi, A New Thrips from Brazil. (Thysanoptera: Phlaeothripidae)

By J. Douglas Hood, Professor of Biology, Emeritus, Cornell University

This species is named after Dr. Charles E. Palm, Director of Research and Director of the Experiment Station at the New York State College of Agriculture at Cornell University, my superior for many years. He has collected Thysanoptera on various occasions, both in the United States and in the American tropics, and has been instrumental in getting material resulting from investigations of banana thrips by the United Fruit Company. The types are in the author's collection.

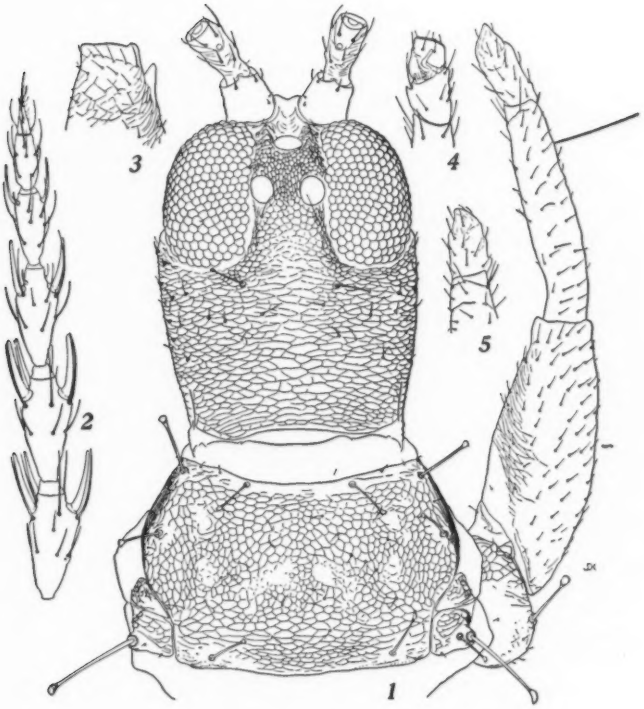
Acanthothrips palmi, sp. nov. (figs. 1–5)

Resembling *nodicornis,* only (among the dark blackish brown species with dark femora), in lacking a white vitta along the sides of the head and prothorax; but differing from that species principally in the presence of a white dash across mesonotum behind middle, the lack of white spots in the fore angles of segments III–VIII of the abdomen, the absence of prominent setigerous tubercles on the cheeks, and the darker, stouter, and much shorter intermediate antennal segments.

Female (macropterous).—Length about 2.8 mm. (fully distended, 3.6 mm.). Color blackish brown, without white markings in head and abdomen, but with a white dash across mesonotum behind middle (this dash is always visible as a pale area in the integument, but the white substance underlying it quickly disappears in preservative); legs blackish brown, with tibiae paler (especially at ends) and tarsi nearly yellow; fore wings lightly washed with brown in anal lobe, along costa to beyond last subbasal seta, in median pocket, and thence along posterior margin to tip; antennae blackish brown, darkest in segments I, II, VII, and VIII, segments III–V dappled with yellow along sides, III sometimes with extreme base of pedicel yellow, IV and V, and sometimes VI, yellow in basal third or more, VII often yellowish at base; internal pigmentation crimson.

Head (fig. 1) typical, its total length about 1.3 times its greatest width across cheeks, 1.4 times that across eyes, and 1.6 times the least width near base, broadest across cheeks at posterior margins of eyes; surface finely polygonally reticulate in ocellar area and along inner margins of eyes, nearly smooth in the deep groove in front of median ocellus, lightly cross-striate with widely-spaced anastomosing lines which form a subreticulation on dorsum and cheeks, the latter thus relatively smooth; cheeks without the usual outstanding tubercles, but with a few pale setae; postocular setae pale brownish, dilated and divided at tip, short (48–51 μ), about as far apart (94–100 μ) as their distance from sides of head, arising about 29 μ from eyes. *Eyes* typical, finely facetted, their dorsal length (in KOH-treated paratype) 155 μ, greatest width 91, least interval (opposite median ocellus) 72, least interval shortly behind posterior ocelli 86. *Ocelli* of posterior pair slightly in advance of middle of eyes, the median ocellus directed forward and situated distinctly behind front margin of eyes. *Antennae* (fig. 2) thoroughly typical of the genus, but with the intermediate segments shorter and stouter than usual, segments III–V abruptly narrowed apically in the usual manner and thus urn-shaped, VIII conical and not narrowed at base, the large sense-cones disposed as follows on the inner (and outer) surfaces of the segments: III 1 (2), IV 1 (2), V 1 (1^{+1}), VI 1 (1^{+1}), VII 1 dorsal. *Mouth-cone* typical, extending fully to posterior margin of prosternum, its length beyond posterior dorsal margin of head 287–308 μ.

Prothorax (fig. 1) along median line of pronotum somewhat less than 0.6 the length of head and (inclusive of coxae) more than 2.3 times as wide as long, its surface lightly reticulate throughout, but more closely and distinctly between the postero-marginal setae, the reticles often roughened; major setae all present, dilated and divided at tip, the epimerals pale, others sometimes brownish, antero-marginals 47 μ (54), antero-angulars 62 (67), midlaterals 60 (57), epimerals 113 (111), postero-marginals 65 (62), coxals 63 (63), in the two paratypes. *Mesonotum* smooth in the pale area crossing it behind



Acanthothrips palmi, sp. nov. (× 141)

1. Head and prothorax, paratype; all sculpture and setae shown.
2. Segments III–VIII of left antennae, ♀, paratype.
3. Tip of left fore femur, ♀, holotype.
4. Right fore tarsus, inner surface, ♀, paratype.
5. Left fore tarsus, dorso-lateral aspect, ♀, paratype.

middle, subreticulate in remainder, the anterior part with the reticles faintly wrinkled and the faint separating lines with conspicuous raised dots; metanotum with well-developed raised pelta which extends to posterior margin and which is polygonally reticulate throughout, the reticles with faint wrinkles, the sep-

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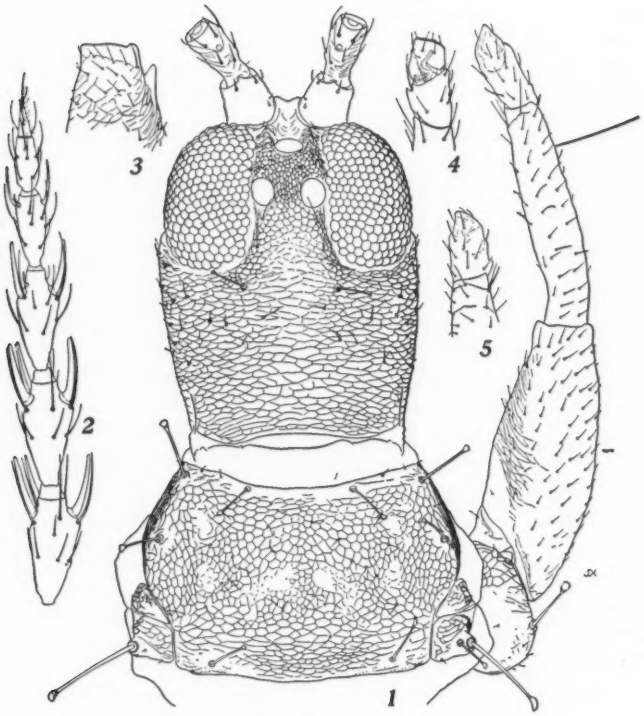

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5. Left fore tarsus, dorso-lateral aspect, ♀, paratype.

middle, subreticulate in remainder, the anterior part with the reticles faintly wrinkled and the faint separating lines with conspicuous raised dots; metanotum with well-developed raised pelta which extends to posterior margin and which is polygonally reticulate throughout, the reticles with faint wrinkles, the sep-

arating lines (except at base and narrowly along sides) with raised dots. *Legs* normal, except that the fore femoral tooth on inner surface near tip may sometimes be wanting (compare figs. 1 and 3); fore femora often more completely sculptured than in specimen used for fig. 1; fore tarsi (fig. 4) with a very small tooth which is pointed when seen in lateral aspect (compare figs. 1, 4, and 5). *Wings* normal, the fore pair somewhat narrowed at middle because of a prominent up-pocket; the usual four subbasal setae present, I (50 μ) close to II and arising posterior to it, II 59–69 μ, III 66–80, IV 87–89; posterior margin with 18–20 accessory hairs.

Abdomen normal, broadest at about segment IV; median tergite of I sector-shaped, with rounded forward point and containing a darker and more heavily sclerotized capstan-shaped area whose posterior margin is narrowly prolonged to sides and thus curved forward, the surface of this median portion lightly polygonally reticulate and minutely longitudinally wrinkled, the more posterior reticles with a few backwardly-directed points; sculpture of rest of abdomen about as usual in the genus; sigmoid wing-retaining setae and the terminal ones dark brown, the others on segments I–IV pale, those on succeeding segments gradually more brownish at base, most of them dilated at tip; setae I and II on IX knobbed, III pointed, their lengths 163, 180, and 210 μ, respectively.

Measurements of female (paratype), in mm., followed (in parentheses) by those of a second (KOH-treated) paratype: Length about 2.8 (2.7), distended, 3.6 (3.6); head, total length 0.365 (0.375), width across eyes 0.266 (0.267), greatest width across cheeks (just behind eyes) 0.280 (0.281), least width in front of basal collar 0.230 (0.234), width across basal collar 0.231 (0.235); prothorax, median length of pronotum 0.210 (0.210), width (inclusive of coxae) 0.487 (0.497); mesothorax, greatest width 0.463 (0.487); fore wings, length 1.29; abdomen, greatest width (at segment IV) 0.497 (0.479); tube (X, only), length 0.224 (0.217), width across basal collar 0.108 (0.110), greatest subbasal width 0.106 (0.108), least apical width 0.059 (0.059), length of terminal setae 0.378 (0.350).

Antennal segments:	I	II	III	IV	V	VI	VII	VIII
Length (μ):	60	73	115	113	106	77	59	38
	(63)	(73)	(113)	(110)	(96)	(64)	(66)	(31)
Width (μ):	58	39	53	53	46	33	26–27	15

Total length of antenna, 0.641 (0.616) mm.

Male (macropterous).—Essentially like female in color and structure; tarsal tooth larger and arising at a right angle.

BRAZIL: Nova Teutonia, Santa Catarina, July, 1957 (1 ♀, holotype; 2 ♂♂, including allotype) and October, 1956 (2 ♀♀, paratypes), collected by Mr. Fritz Plaumann from dead branches.

It is interesting to note that two of the three females, even after one of the fore legs of each was remounted and studied in lateral aspect—one of them after treatment with KOH—show no evidence of a fore-femoral tooth. This tooth, heretofore quite generally looked upon as the most distinctive generic character, thus appears to be of no great importance. There are parallel cases of such variation in allied genera.

A New Lysiopetalid Diplopod from Arizona

By RALPH V. CHAMBERLIN

The milliped genus *Colactis* has been known from some six species occurring in Arizona, one from southern Utah, and one from Lower California. A specimen representing an additional species, here described, was taken by Vincent Roth in Yuma County, Arizona.

Colactis yuma new species

Body cylindrical, proportionately long, and composed in the type of 71 segments.

Eye patch subtrapeziform, the lower margin longer than the upper.

First three or four tergites narrower than those following. The first tergite with ten crests of which the two paramedian are parallel; the usual ten setae in a transverse series in front of the crests. Poriferous keels thickened about the large pore, dorsal line moderately convex, dorsocaudal corner angular, projecting a little above base. Of the other crests the major ones are high, with dorsal line nearly straight, highest at caudal end with the corner angular, the anterior rounded as usual. Transition to full number of crests at about segment 16. The last joint on the first three pairs of legs with a comb of hairs beneath, that joint on the following three pairs with velutinous pad beneath.

FIG. 1. *Colactis yuma* sp. n. Gonopod of male, lateral view.

The male gonopods differ from any heretofore described in having the apical portion of the solenomierit entirely smooth, being neither furcate nor spurred; also in the rounded outline of the terminal lamina, the margin of which presents neither angle nor tooth.

Length, 38–40 mm.

Locality.—ARIZONA: Yuma County, near Laguna Dam. One male taken March 3, 1957.

Aside from the distinctive features of the gonopods as figured, this species seems to differ superficially from all others known excepting *baboquivari,* in the strictly cylindrical form of the body. From that species it differs in gonopods, larger size, and greater number of body segments—71 as against 50–55.

Grooming Behavior in Orthoptera [1]

By S. K. Gangwere

Observations upon grooming behavior in the Orthoptera are but scantily represented in the literature. Only Allard (1929) has published upon this subject. His treatment is limited to the katydid *Orchelimum vulgare,* and it includes nothing on the action of the individual mouthparts during the cleaning process. The obvious need for a better understanding of grooming has prompted the following report, which is based upon numerous observations made over a period of five years.

Methods of Study

Observations carried out in the field, with and without the use of binocular field glasses, contributed to an understanding of some of the more general aspects of grooming behavior but were unsatisfactory in the study of movements of the mouthparts. Most of the following data, as a result, were taken in the laboratory. Two different methods were employed. First, Orthoptera were confined individually within small, rectangular glass chambers within which their activities were observed under a dissecting microscope. Second, motion picture photography was employed to analyze further the rapid and complex grooming of one species, the large cockroach *Byrsotria fumigata.* The 16 mm. camera used for this purpose was a Cine-Kodak Special II, fitted with a 63 mm. f2.7 lens and an 8 in. extension tube, and set at 64 frames per second. Illumination was provided by three Spencer microscope lamps fitted with heat filters to protect the cockroaches.

Results

Unpublished work by the author shows that there are, from both a functional and structural point of view, two basic types of mouthparts in the Orthoptera. Since grooming in these insects

[1] Contribution No. 18 from the Department of Biology, Wayne State University, Detroit 2, Michigan.

is largely a function of the mouthparts, it is not surprising that there are also two grooming methods. The first method is used by cockroaches, camel crickets, katydids, crickets, etc.; these forms have swollen, lobular distagaleae adapted for wiping minute food particles and juices into the mouth (fig. 1). The second method is used by locusts or short-horned grasshoppers; these insects have flattened, plate-like distagaleae adapted as lateral lips but useless in feeding (fig. 2). The insects using the former grooming method are, in addition, generally characterized by comparatively long antennae and entire or non-emarginate labra; those using the latter by comparatively short antennae and emarginate labra.

Grooming by Method 1. During their periods of activity, the cockroach and other orthopterans having long antennae groom themselves frequently, sometimes as often as once or twice every ten minutes. In doing so, they follow closely the generalized pattern discussed below. Cleaning of the face is accomplished by the tarsi of either the right or left fore leg, depending upon the side to be cleaned. The underside of the tarsus is first pressed to the mouthparts, where the distagaleae and laciniae respectively wipe and scrape it, the activities of these pairs being synchronous. Whether or not the tarsus is wetted by saliva is difficult to say, but at least no moisture is evident upon its surface. The face is then wiped with a downward motion of the cleaned foot. As in grooming of appendages, the operation may be repeated several times on each side. Grooming of the wings, like that of the face, is carried out by the cleaned legs, in this case the hind ones.

In cleaning an antenna it is caught by the fore foot of the same side and pulled downward and inward toward the mouthparts, where it is held in a channel formed by the medial groove of the labium and by the crossed labial palpi. The apices of the maxillary palpi may touch the antenna to keep it oriented. Synchronously and rapidly the distagaleae wipe and the laciniae rasp the antennal surface. The incisor surfaces of the mandibles, which may be either together or apart, and the apical margin of the labrum may assist in cleaning as the antenna is

scraped against them. The antenna is pulled through by the antennal extensor muscles, perhaps aided by the ligula, which opens and closes, apparently carrying the antenna with it as it moves cephalad during closure. Each cleaning operation may last 30 seconds or more.

The palpi are cleaned in much the same manner as the antennae. A maxillary palpus is flexed caudad and thrust into a channel formed by the crossed labial palpi. The terminal one or two segments are then cleaned in the foregoing manner by the distagaleae and laciniae. The labial palpi, because of their position, must be flexed cephalad and are not confined within a palpus-enclosed channel when they are cleaned. In all other respects their grooming is like that of the maxillary palpi.

Nineteen species of non-acridoid Orthoptera were observed, but not all were seen to groom; therefore, the foregoing generalized account of grooming behavior is based upon numerous observations in the following fourteen species, all of them showing remarkable similarity in their grooming pattern:

Blattidae: cockroaches
Blattella germanica
Byrsotria fumigata
Parcoblatta pensylvanica

Tettigoniidae: katydids
Amblycorypha oblongifolia
Amblycorypha rotundifolia
Conocephalus f. fasciatus
Conocephalus nigropleurum

Tettigoniidae (cont.)
Neoconocephalus ensiger
Orchelimum gladiator
Orchelimum volantum
Scudderia f. furcata

Gryllidae: crickets
Acheta pennsylvanica
Nemobius f. fasciatus
Oecanthus angustipennis

Grooming by Method 2. The short-horned grasshoppers groom themselves comparatively infrequently, and when grooming occurs it is done in such a manner that it is most difficult to observe, even in the laboratory; thus, it is not surprising that a few details of the cleaning operation are yet imperfectly understood. These insects groom their faces and wings much as do cockroaches; that is, by wiping the cleaned tarsus over the surface to be groomed. The flap-like distagaleae of these insects, however, are neither adapted nor used for cleaning; thus, when the tarsus is applied to the mouthparts it is rasped by the

laciniae, sometimes by the mandibles, and perhaps wetted by saliva.

The comparatively short antennae of these latter insects are not cleaned directly by the mouthparts but by the tarsi. The grasshopper reaches up with a newly cleaned fore tarsus and, using its tarsal claws to ensnare the antenna of that side, presses the apical portion of the antenna against the ground or other surface upon which the animal is resting; then, by pulling the head away from the tarsus, the insect draws the antenna from between the surface and the tarsal pads. The proximal part of the antenna cannot be groomed in this manner but must be rubbed by the cleaned fore tarsus of the same side of the body.

Twenty-three species of acridoids were observed in this study, but not all were seen to groom; therefore, the foregoing generalized account of grooming behavior is based upon observations in the following six species, all of them showing remarkable similarity in their grooming pattern:

Tetrigidae: grouse locusts
Tettigidea lateralis parvipennis

Acrididae: grasshoppers
Arphia sulphurea

Acrididae (cont.)
Chortophaga viridifasciata
Encoptolophus s. sordidus
Melanoplus confusus
Melanoplus f.-r. femur-rubrum

Summary and Discussion

Modern Orthoptera are known to have been derived from two major lines, the Protorthoptera and the Protoblattoidea

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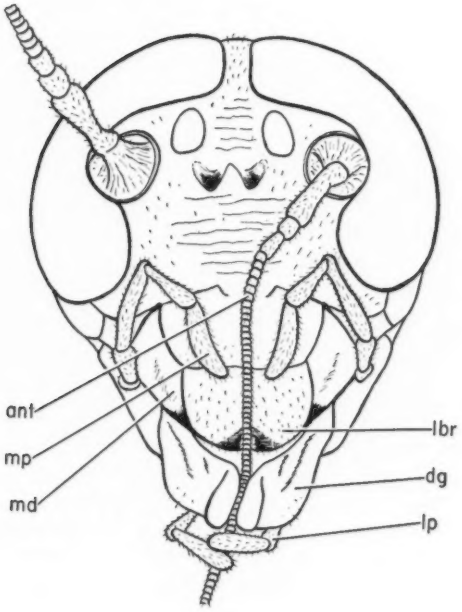
Explanation of Figures

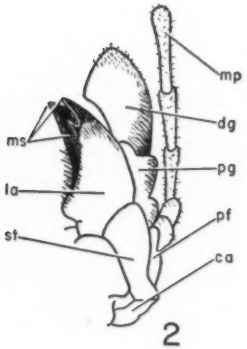
Fig. 1. A view of the head of the cockroach *Blaberus craniifer*, showing the relationships of the mouthparts during antennal grooming (Method 1).

Ant—antenna
Dg—distagalea
Lp—labial palpus
Lbr—labrum
Md—mandible
Mp—maxillary palpus

Fig. 2. The left maxilla of a short-horned grasshopper, the slant-face *Syrbula admirabilis*.

Ca—cardo
Dg—distagalea
La—lacinia
Mp—maxillary palpus
Ms—maxadentes
Pf—palpifer
Pg—proxagalea
St—stipes





2

(Zeuner, 1939). Each of these has given rise to insects which utilize Grooming Method 1, but only the Acridoidea, a branch from the Protorthoptera, is composed of insects which utilize Method 2. In Method 1, used by such Orthoptera as cockroaches, camel crickets, katydids, and crickets, the cleaning of the appendages, including the antennae, is primarily through the rapid, synchronous movement of the distagaleae and laciniae. In Method 2, used by short-horned grasshoppers, the distagaleae are not used in cleaning, the laciniae and mandibles being used to complete the operation. In insects utilizing the latter method of grooming, antennal cleaning is accomplished by drawing the appendage from between the cleaned tarsal pads and the surface upon which the animal is resting. It is evident that there exists a close correlation between the insects' structure, both antennal and mouthpart, and their grooming behavior.

Acknowledgments

The author is deeply indebted to a number of persons whose assistance made possible the completion of this paper. Drs. T. H. Hubbell and I. J. Cantrall, of the University of Michigan Museum of Zoology, contributed numerous suggestions and were helpful in various other ways. Dr. Edward R. Baylor, of the Department of Zoology of the University of Michigan, loaned the author much of the photographic equipment used in the study and advised him as to its use. The above, Prof. Jessie L. Metcalf, of the Department of Biology of Wayne State University, Dr. Alfred M. Beeton, of the U. S. Fish and Wildlife Service, and Dr. and Mrs. Henry Townes, of the University of Michigan Museum of Zoology, rendered invaluable service by critically reviewing the manuscript. Mr. Burt D. Brent, of Detroit, drew the first of the figures.

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Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae). Part XVII

By CHARLES P. ALEXANDER, Amherst, Massachusetts *

The preceding part under this general title was published in ENTOMOLOGICAL NEWS, 67: 210–216, 1956. The new species discussed herewith were collected by the writer in California, Colorado and Montana, representing part of the novelties discovered in the course of the comprehensive survey of Western North American Tipulidae. Types of the species are incorporated in the Alexander Collection of Crane-flies.

Limonia (Dicranomyia) homichlophila new species

Allied to *pudica;* size relatively small (wing about 6 mm.); general coloration of entire body pale yellow; wings subhyaline, stigma barely indicated; ovipositor with cerci very slender; male hypopygium with posterior border of tergite very feebly emarginate; ventromesal lobe of basistyle without an accessory lobule; ventral dististyle with the rostral prolongation relatively short, the subacute apex simple; rostral spines placed close together on small subequal basal tubercles.

♂. Length about 4.5–4.8 mm.; wing 5.3–6 mm.; antenna about 0.8–0.9 mm.

♀. Length about 6.5 mm.; wing 6 mm.

Rostrum yellow, light gray pruinose; palpi light brown. Antennae with scape and pedicel obscure yellow to brownish yellow, flagellum yellowish brown to brownish black; flagellar

* Contribution No. 1285 from the Department of Entomology, University of Massachusetts.

Field work in 1955 in Colorado was made possible by a grant-in-aid from The American Philosophical Society (Grant No. 1889). Work in 1956, particularly in Idaho, Montana and Washington, and in 1957 in Arizona and California, was supported by grants from the National Science Foundation covering travel and subsistence. I wish to express my deepest thanks and appreciation to these Foundations for this financial aid, covering the general major project "The crane-flies of Western North America."

segments short-oval to oval, slightly exceeding the verticils. Head obscure yellow, with a whitish bloom; anterior vertex relatively broad, about one and one-half times the diameter of the scape.

Thorax uniformly pale yellow, without pattern. Halteres yellow, knobs weakly darkened. Legs with the coxae and trochanters pale yellow; remainder of legs obscure yellow, terminal tarsal segments infuscated; claws with a single strong outer tooth and a few weak more basal denticles. Wings subhyaline, stigma barely indicated; veins brownish yellow to very light brown. Venation: Sc_1 ending approximately opposite the origin of *Rs*, in cases shortly beyond, Sc_2 slightly removed, about opposite this origin; free tip of Sc_2 and R_2 in transverse alignment; cell *1st* M_2 subrectangular, about equal in length to the distal section of vein M_3; *m–cu* at or close to fork of *M*.

Abdomen obscure yellow to brownish yellow, sternites clearer. Ovipositor with the cerci very slender, gently upcurved, tips acute. Male hypopygium with the ninth tergite narrowly transverse, the posterior border very feebly emarginate, cephalic margin nearly straight; setae relatively few. Ninth sternite semioval, its setae long and conspicuous. Basistyle smaller in area than the ventral dististyle; ventromesal lobe simple, obtuse, without an accessory basal lobule. Dorsal dististyle gently curved, the apex suddenly narrowed into a spine, the base not dilated. Ventral dististyle with the rostral prolongation markedly shorter than in *pudica,* blackened, the tip subacute, simple; rostral spines relatively conspicuous, about equal in length to the rostrum beyond their insertion, placed close together on small subequal tubercles. Gonapophysis with the mesal-apical lobe a relatively slender blackened spine, its tip acute.

Habitat. CALIFORNIA. *Holotype:* ♂, Vernal Falls of the Merced River, Yosemite National Park, 5,000 feet, July 1, 1957 (C. P. Alexander). *Allotopotype:* ♀, pinned with the type. *Paratopotypes:* 8 ♂♀.

The most similar species is *Limonia* (*Dicranomyia*) *pudica* (Osten Sacken) which differs most evidently in the details of structure of the male hypopygium. The present fly was found

on the wet rocks and in the constant spray of Vernal Falls, near the base, and on the south side of the stream. Here it was associated with abundant specimens of *Elliptera clausa* Osten Sacken. It may be noted that this spot is the exact type locality for the *Elliptera,* where the species was found by Osten Sacken on June 11, 1876.* The habitat, in the eternal spray of the falls, has suggested the specific name of the present fly (to love mist).

Pedicia (Pedicia) lewisiana new species

Allied to *parvicellula* and *subobtusa;* wing pattern pale brown, seam on vein *Cu* narrow, ending at *m–cu*; male hypopygium with the tergal lobes broadly obtuse at tips; basistyle with outer apical angle produced into a short stout spine.

♂. Length about 20–21 mm.; wing 19–20 mm.

Rostrum and head brownish gray, the latter clearer gray behind; palpi dark brown. Antennae relatively short, almost uniformly yellowish brown to light brown.

Pronotum obscure brownish yellow, narrowly dark brown on sides, the color continued onto the dorsopleural membrane to form an inconspicuous stripe. Mesonotal praescutum light gray, with four brown stripes, the intermediate pair separated by a narrow ground line that widens on posterior half; scutellum chiefly yellow; postnotum variegated brownish gray and obscure yellow. Pleura pale yellow, the sternopleurite slightly darker. Halteres with stem whitened, knob weakly darkened, the apex somewhat paler. Legs with the coxae light gray; trochanters yellow; femora brownish yellow, the tips gradually brownish black; tibiae yellow, tips more narrowly blackened; tarsi light brown, the outer ones dark brown. Wings with the brown pattern pale; seam on *Cu* narrow, ending at *m–cu*. Venation: *r–m* at fork of *Rs*, in alignment with R_{2+3}; cell R_4 short-petiolate.

Abdomen with tergites dark brown, the lateral borders yellow;

* Osten Sacken, C. R. Western Diptera. Bull. U. S. Geol. Survey, 3: 198; 1877. Record of my life work in Entomology, Part Third, pp. 215–218, 1904 (Heidelberg, Germany).

sternites dark brown, the lateral borders more broadly light gray, the posterior margins of the segments narrowly and abruptly yellow; hypopygium large, yellow. Male hypopygium with the tergal lobes narrowly separated, the tips broadly obtuse. Basistyle with outer apical angle produced into a short stout spine; no marked concentration of setae on face of style, as in *subobtusa*. Dististyle with the lower marginal spine from a strong basal tubercle; outer pegs or spines two or three in number, in a compact group.

Habitat. MONTANA. *Holotype:* ♂, Sacajawea Park, Lemhi Pass, 7,400 feet, June 26, 1956 (C. P. Alexander). *Paratopotypes:* 3♂♂.

Named in honor of Captain Meriwether Lewis (1774–1809), co-leader of America's most famous exploring expedition. The type locality of the present fly is at the highest source of the Missouri River at Lemhi Pass, about 100 feet below the small spring whence the river arises as a small branch of Pass Creek. At this point the river is scarcely more than a foot across, with small swampy areas on either bank, where the present flies and many other species of crane-flies occurred. Lewis and Clark remained at this locality for nearly two weeks in August 1805 while obtaining horses to enable them to continue westward to the Pacific. The note in Lewis's *Journal* under date of Monday, August 12th, 1805, reads: "At the distance of 4 miles further the road took us to the most distant fountain of the waters of the Mighty Missouri in surch of which we have spent so many toilsome days and wristless nights."—Original spelling retained.

In the structure of the male hypopygium, particularly the outer spine of the basistyle, the species is nearly intermediate between *Pedicia* (*Pedicia*) *parvicellula* Alexander on one hand and *P.* (*P.*) *subobtusa* Alexander on the other.

Paradelphomyia (Oxyrhiza) sierrensis new species

General coloration of thorax yellow; antennal flagellum dark brown; wings subhyaline, cell M_1 present; male hypopygium with the apex of basistyle produced into a subacute point, the

outer setae unmodified; outer dististyle narrowest before the slightly expanded apex; spines of the ventral fork very slender, pale.

♂. Length about 4–4.5 mm.; wing 4.8–5 mm.

♀. Length about 4.5 mm.; wing 5 mm.

Rostrum brownish yellow; palpi dark brown. Antennae 16-segmented, brownish black, scape paler; flagellar segments oval, the outer ones more elongate, with long verticils. Head brown.

Pronotum light brown, scutellum more yellowed. Mesonotal praescutum brownish yellow, in cases vaguely darker medially; posterior sclerites and pleura clear yellow, the surface nitidous. Halteres with stem pale, knob infuscated. Legs with the coxae and trochanters yellow; remainder of legs brownish yellow, the outer segments passing into brown. Wings subhyaline, prearcular and costal fields slightly more yellowed; veins brown. Sparse macrotrichia in outer ends of cells R_2 to M_4, inclusive. Venation: Veins R_3 and R_4 gently divergent outwardly; cell M_1 present, from one-third to one-half its petiole; *m–cu* beyond the fork of *M*.

Abdominal tergites brown, sternites obscure yellow, subterminal segments of male more darkened to form a ring; genitalia of both sexes yellow. Male hypopygium generally as in *pacifica*, differing in important details. Apex of basistyle produced into a subacute point, the outer setae elongate but slender. Outer dististyle narrowest at midlength or before the slightly expanded apex. Spines of the ventral fork very slender, pale.

Habitat. CALIFORNIA. *Holotype:* ♂, Swale Camp, Kings Canyon National Park, about one mile south of the General Grant Big Tree, 6,400 feet, July 19, 1957 (C. P. Alexander). *Allotopotype:* ♀. *Paratopotypes:* several ♂♀. *Paratype:* 1♀, Sotcher Lake, Reds Meadow, Mammoth Lakes District, 7,600 feet, July 29, 1957 (C. P. Alexander).

Paradelphomyia (*Oxyrhiza*) *sierrensis* is most nearly related to *P.* (*O.*) *pacifica* (Alexander) of northwestern North America, differing most evidently in the structure of the male hypopygium, as described. The eastern Nearctic *P.* (*O.*) *americana* (Alexander) is nearly intermediate between the two western species in these characters.

Ormosia (Rhypholophus) arapaho new species

General coloration of head and thorax gray; antennae black throughout; legs brownish black to black; male hypopygium with the gonapophysis appearing as a simple black subtriangular structure, without branches; arms of aedeagus short.

♂. Length about 5.3–5.5 mm.; wing 5–5.5 mm.; antenna about 1.1–1.2 mm.

♀. Length about 6–6.2 mm.; wing 6–6.5 mm.

Rostrum dark gray; palpi black. Antennae black; flagellar segments oval. Head gray.

Pronotum dark gray. Mesonotal praescutum gray, with four brownish stripes, the intermediate pair separated by a line that is slightly narrower than either stripe; lateral stripes paler brown; pseudosutural foveae and tuberculate pits black, conspicuous; posterior sclerites of notum gray, the scutal lobes slightly patterned with darker near the midline. Pleura lighter gray; dorsopleural membrane dusky. Halteres whitened. Legs with the coxae gray; trochanters brownish yellow; remainder of legs brownish black to black. Wings whitish subhyaline; vein *Cu* in cell *M* vaguely seamed with darker; stigma brown; veins brown. Venation: Sc_1 ending opposite R_2, Sc_2 far removed; R_2 at fork of R_{2+3+4}; cell *1st* M_2 relatively small, the second section of vein M_{1+2} about one-half the outer section; *m–cu* about one-half its length beyond the fork of *M*; vein *2nd A* strongly sinuous on outer half. The female paratype has cell M_2 of one wing open by the atrophy of *m*.

Abdomen dark brown, gray pruinose; ninth segment of male and genital segment of female brightened. Ovipositor with cerci yellow, strongly upcurved to the acute tips. Male hypopygium with the tergite transverse, the sides rounded oval, with conspicuous setae, the broad central area without major vestiture but with a narrow transverse sclerotized bar. Outer dististyle rather broadly dilated outwardly, the margin blackened, outer apical angle more extended; inner style a flattened brownish yellow blade. Gonapophysis distinctive, appearing as a simple black subtriangular structure, narrowed outwardly to an acute point, without branches. Arms of the aedeagus relatively short, the tips gently upcurved.

Habitat. COLORADO (Rocky Mountain National Park). *Holotype:* Trail Ridge Road, 11,300 feet, July 30, 1955 (C. P. Alexander). *Allotopotype:* ♀, pinned with type. *Paratypes:* 1 ♂, 1 ♀, Beaver Creek at Milner Pass, 10,730 feet, July 19, 1955 (C. P. Alexander).

The types were collected at timberline among low shrubby willows, swept from the latter, *Caltha, Cardamine, Senecio triangularis,* and other herbs. The small streamlets flow through gravel beds among the willow thickets, dropping rapidly and flowing into the Cache la Poudre River far below. The paratypes were found along Beaver Creek, near the ultimate source of the Colorado (Grand) River, where they were swept from the vegetation. The itinerary covering this part of field collecting in Colorado has been outlined elsewhere.*

The most similar described species is *Ormosia* (*Rhypholophus*) *bifidaria* (Alexander). The present fly differs conspicuously in the structure of the male hypopygium, particularly the simple compact gonapophyses which are quite distinct from all previously described species of the subgenus.

Molophilus (Molophilus) oligacanthus new species

Belongs to the *gracilis* group, *pubipennis* subgroup; general coloration dark brown; antennae short in both sexes; legs dark brown to blackened; wings broad, macrotrichia of veins dark; male hypopygium with tip of apical lobe of basistyle subacute; both dististyles with relatively sparse armature, the outer style without spinules on basal half; phallosomic plate broadly obtuse at apex, the surface with delicate setulae.

♂. Length about 4.5–4.6 mm.; wing 5.2–5.7 mm.; antenna about 1.1–1.2 mm.

♀. Length about 5–5.2 mm.; wing 5.8–6 mm.

Rostrum brown; palpi dark brown. Antennae relatively short, brown to brownish black; flagellar segments long-oval, the basal ones with very long verticils. Head light brown.

* ALEXANDER, CHARLES P. Distribution of crane-flies in the state of Colorado. The American Philosophical Society Year Book 1955: 122–125; 1956.

Thorax varying from light to dark brown, the pleura more pruinose. Halteres yellow. Legs with the coxae and trochanters yellow; remainder of legs dark brown to blackish. Wings broad, subhyaline, the prearcular field more yellowed; veins pale brown, macrotrichia dark brown. Venation: R_2 lying distally to *r–m*; petiole of cell M_3 from one and one-half to two times *m–cu*; vein *2nd A* sinuous, ending some distance beyond the level of *m–cu*.

Abdomen dark brown, hypopygium more yellowed. Male hypopygium much as in *spiculatus*, differing in details. Apical lobe of basistyle moderately slender, tip subacute, the setae not including the apex. Both dististyles with relatively sparse armature; outer style without spinules on basal half, on outer part these restricted to the upper edge and ventral margin; inner style longer, strongly curved beyond midlength, as in *spiculatus;* spines relatively large but scattered and few in number, especially on the outer or convex side. Phallosomic plate broadly obtuse at apex, surface with delicate setulae.

Habitat. CALIFORNIA. *Holotype:* ♂, somewhat teneral, Coldwater Creek above Lake Mary, Mammoth Lakes District, Sierra Nevadas, 9,000 feet, July 6, 1957 (C. P. Alexander). *Allotopotype:* ♀, July 5, 1957. *Paratopotypes:* Several ♂♀, July 5–6, 1957.

The type series was taken in an extensive boggy area that included small cold sunken streamlets flowing into Coldwater Creek. The sparse tree cover included chiefly lodgepole pine and mountain hemlock; shrubs and herbs chiefly *Kalmia, Ledum* and *Phyllodoce,* with *Veratrum, Allium* and *Saxifraga,* growing amidst abundant short sedges and rushes and among dense mosses. Associated crane-flies included *Limonia* (*Limonia*) *venusta* (Bergroth), *Ornithodes brevirostris* Alexander, *Limnophila occidens* Alexander, *Gonomyia* (*Gonomyia*) *bihamata* Alexander, *Erioptera* (*Mesocyphona*) *melanderiana* Alexander, *Erioptera* (*Psiloconopa*) *rainieria* Alexander, and many others.

The most similar species is *Molophilus* (*Molophilus*) *spiculatus* Alexander, which is most readily separated by the details of structure of the male hypopygium, particularly the armature of the dististyles.

Dodds's Types for Two Species of Callibaetis (Ephemeroptera)

By Thomas B. Thew, Davenport Public Museum, Davenport, Iowa

Two species of mayflies, *Callibaetis vitreus* and *Callibaetis fuscus*, were described by Dodds in 1923 (Trans. Amer. Ent. Soc. 49: 93–114) in the results of his studies on the fauna of Colorado. Unfortunately, not only were the original descriptions extremely terse, but also no designation of a type for one species was made. In the Biology of Mayflies (Ithaca, New York, 1935), Traver pointed out that *C. vitreus* Dodds was a primary homonym of *C. vitreus* Navas and so renamed the former species *C. doddsi*. She could not place either of Dodds's species correctly, however, for the necessary detailed descriptions were lacking. Through the kindness of Harold J. Grant, Jr., of the Academy of Natural Sciences of Philadelphia, the author has been allowed to examine Dodds's material of these two ephemerids. Consequently, I hereby designate the male (Acad. Nat. Sci. Phila. type no. 9026), of the syntypical series of one male, one female, and one nymph as the lectotype of *C. fuscus* Dodds. I have also examined the single type, a male (Acad. Nat. Sci. Phila. type no. 9027) of *C. vitreus* Dodds [= *C. doddsi* Traver]. A detailed description of each species will be given in a subsequent paper.

Halysidota tessellaris S & A and Pollenia

By S. W. Frost, Pennsylvania State University

In making counts of *Halysidota tessellaris* taken from light traps operated during the summer of 1957, the writer noticed that many had pollenia attached to the tarsi of the legs. The moths were first noticed at the light traps in numbers on June 30. At that time it was not suspected that specimens with pollenia would later be taken abundantly and it is possible that a few moths with pollenia escaped notice. By July 3 the prob-

lem became evident and thereafter counts were made daily until August 18.

Several interesting observations were made. There were no milkweed plants, the only group of plants bearing pollenia in our area, near the location of the light traps. The moths must have travelled a considerable distance to reach the traps. Numerous insects bearing pollenia have been observed by the writer and by others but as far as known there is no mention of *Halysidota tessellaris* visiting milkweed. The larvae are known to feed on maple and many other trees. Frequent examinations of milkweed during the summer failed to reveal the presence of these moths. They are strong fliers and are never trapped as is the case of some of the small moths. Milkweed pods were well formed by August 2. After that date moths, due to seasonal conditions, were scarce and none bearing pollenia were recovered. It is evident that males came to light more frequently than females and apparently males visit milkweed more often than females. It is also interesting to note that none of the other species of moths captured in light traps bore pollenia.

Pollenia on the legs of *Halysidota tessellaris*

Period	Males		Females	
	Total number	No. with pollenia	Total number	No. with pollenia
June 30–July 2	110	0	63	0
July 3–8	422	70	195	19
July 9–13	237	56	105	9
July 14–18	227	43	114	20
July 19–23	213	48	113	11
July 24–28	39	8	24	2
July 29–Aug. 2	25	3	13	1
Aug. 3–7	5	0	1	0
Aug. 8–13	2	0	1	0
Aug. 14–18	1	0	1	0
Totals	1281	228	630	62

Retirement of Francis Hemming

FRANCIS HEMMING, Honorary Secretary to the International Commission on Zoological Nomenclature since 1936, is retiring from office on account of ill-health, according to an announcement of the International Trust of Zoological Nomenclature. In consultation with Sir Gavin de Beer, Director of the British Museum (Nat. Hist.), and President of the coming 15th International Congress of Zoology, the Trust has arranged for R. V. Melville, a senior member of the paleontological staff of the Geological Survey, London, to be released by the Survey for one year, to take charge, beginning May 1, of the Office of the Commission, with the title: "Assistant Secretary to the Director of the Office of the International Commission on Zoological Nomenclature." Sir Gavin has also asked Mr. Melville to act as Recorder for the Section on Nomenclature of the International Congress of Zoology meeting next July.

In order that Mr. Melville may concentrate on urgent tasks relating to the coming Colloquium on Zoological Nomenclature, Mr. Hemming has consented to complete certain work already begun, including the printing of the Lists and the Indexes, and the Opinions on decisions already taken. One of the first duties of the new Secretary will be to find suitable accommodation for the Office, hitherto housed rent-free in Mr. Hemming's private residence.

Laboratory Training Class

A schedule of the Laboratory Refresher Training Courses that will be given by the Laboratory Branch of the Communicable Disease Center during the period Sept. 15, 1958 to Apr. 10, 1959, has been issued. Twenty-three courses, varying from 1 to 4 weeks in length are offered on laboratory diagnoses of various viral, bacterial, rickettsial, fungous, protozoan and other parasitic diseases of man and animals. For information and application forms write to: Laboratory Branch, Communicable Disease Center, U. S. Public Health Service, P. O. Box 185, Chamblee, Ga.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleign, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nishiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Dominick J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

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THE NEOTROPICAL SPECIES OF THE 'SUBGENUS AESCHNA' SENSU SELYSII 1883 (Odonata)

By Philip P. Calvert

This paper presents an account of the Neotropical species referred by de Selys in 1883 to his subgenus *Aeschna* and of some species unknown to him. His subgenus is here divided into three genera, *Aeschna, Coryphaeschna,* and *Castoraeschna, Aeshna* in its turn being subdivided into the subgenera *Aeschna, Hesperaeschna, Rhionaeschna, Schizuraeschna, Marmaraeschna* and *Neureclipa.* These five subgenera include 2, 15, 1, 3, 4 and 5 species and subspecies respectively. *Coryphaeschna* embraces 9 species and subspecies, *Castoraeschna* 5. Larvae of 2 species of *Hesperaeschna,* 1 species of *Schizuraeschna,* 1 species of *Neureclipa* and 6 species of *Coryphaeschna* are described and figured. Generalities are discussed under the headings: Relationships of the Neotropical Aeshnas to the North American fossils; Relations of the South American Aeshnas to the Palaearctic and Australian species; The geological age and geographical distribution of the ancestors of the Odonata and of the Mammalia; Relations of the Neotropical Aeshnas to each other; The seasonal distribution of the Neotropical species of Aeshna. Forty plates in black and white illustrate the structural and colorational features of the adults, seven those of the larvae. Nineteen tables show the variations in size and in venation of the adults. Six maps show the geographic distribution of all the species concerned. There is an alphabetical index of species, subgenera, genera, authors quoted, and topics.

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